

REMARKS

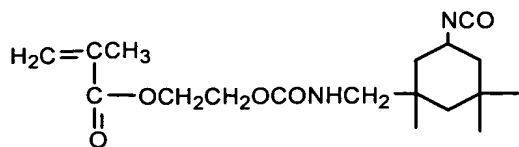
Claims 1-10 are pending in the present application.

At the outset, Applicants wish to thank Examiner Reddick for the helpful and courteous discussions with their undersigned Representative on January 12, 2005. During these discussions, various amendments and arguments to address the rejections over the art of record were discussed. The content of this discussion is believed to be reflected in the present response.

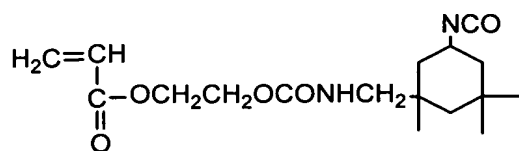
The rejection of Claims 1-10 under 35 U.S.C. §103(a) over Shimada et al (EP 898 011), alone, and further in combination with Ito et al (US 5,578,688), is respectfully traversed.

The present invention relates to a water- and oil-repellent composition that contains (A) a polymer defined below, (B) an aqueous medium and (C) a surfactant in a mass ratio of (A)/(B)/(C)=100/100-500/1-10, where polymer (A) is a copolymer having the following components:

- (1) a monomer unit based on a (meth)acrylate having a polyfluoroalkyl group,
- (2) a monomer unit based on an alkyl(meth)acrylate having a C₁-C₁₂ alkyl group,
- (3) a monomer unit based on an alkyl(meth)acrylate having a C₁₆-C₂₂ alkyl group, and
- (4) a monomer unit based on at least one compound selected from the group consisting of 2-isocyanate ethyl methacrylate, 1,3,3-trimethyl-4-isocyanate cyclohexylmethyamidoxyethyl methacrylate of Formula 1 and 1,3,3-trimethyl-4-isocyanate cyclohexylmethyamidoxyethyl acrylate of Formula 2, the isocyanate group of which is blocked:



Formula 1



Formula 2. (see Claim 1)

Applicants submit that the art of record cannot affect the patentability of the claimed invention for the following reasons.

However, based on a review of the cited art of record as represented by Shimada et al and Ito et al, it appears that the Examiner has misapplied these references. Specifically, Applicants note that these references do not disclose or suggest the polymer defined in the claimed invention (*supra*).

Further, MPEP §2142 states: "To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation... to modify the reference... Second, there must be a reasonable expectation of success. Finally, the prior art reference... must teach or suggest all the claim limitations." For the reasons below, Shimada et al and Ito et al, fail to support even a *prima facie* case of obviousness based on the lack of a disclosure or suggestion of each of the monomer units (1) – (4).

To this end, Applicants note that Shimada et al and Ito et al collectively disclose monomer units within the scope of (1) and (4) defined in Claim 1 and a *monomer unit* based on alkyl(meth)acrylates. However, no disclosure or suggestion can be found in these references for the polymer to contain *two distinct* alkyl(meth)acrylates (*i.e.*, one with a short alkyl chain and one with a long alkyl chain). Accordingly, the combined disclosures of Shimada et al and Ito et al clearly fail to meet the standard to establish a *prima facie* case of obviousness as set forth in MPEP §2142.

Moreover, even if the artisan were to overlook the deficiency in the combined disclosures of Shimada et al and Ito et al, Applicants submit that the advantages obtained by the claimed invention (e.g., impart excellent durability in the water and oil repellency to a material to be treated therewith, does not cause yellowing in the material so treated, does not cause crude hardening of hand feeling of the treated material, provides a convenient process method as compared to conventional methods, provides a processing bath that has excellent stability, is easy to handle, and is relatively inexpensive) would not be apparent.

Specifically, Applicants have found that these advantages are provided by the specific composition of polymer (A) in conjunction with the aqueous medium (B) and surfactant (C), when these components are maintained in a mass ratio of (A)/(B)/(C)=100/100-500/1-10. Not only do Shimada et al and Ito et al fail to provide a specific disclosure, with sufficient specificity, of this particular mass ratio, these references fail to disclose the particular composition of polymer (A), which is a copolymer having the following components:

- (1) a monomer unit based on a (meth)acrylate having a polyfluoroalkyl group,
- (2) a monomer unit based on an alkyl(meth)acrylate having a C₁-C₁₂ alkyl group,
- (3) a monomer unit based on an alkyl(meth)acrylate having a C₁₆-C₂₂ alkyl group, and
- (4) a monomer unit based on at least one compound selected from the group consisting of 2-isocyanate ethyl methacrylate, 1,3,3-trimethyl-4-isocyanate cyclohexylmethyamidoxyethyl methacrylate of Formula 1 and 1,3,3-trimethyl-4-isocyanate cyclohexylmethyamidoxyethyl acrylate of Formula 2, the isocyanate group of which is blocked, or the benefits flowing therefrom.

As evidence of the superior properties flowing from the claimed invention compared to replacing polymer (A) (*i.e.*, a copolymer containing each of components (1), (2), (3), and (4)) with (a) a polymer containing only components (1), (2), and (4), and (b) a polymer

containing only components (1), (3), and (4), Applicants direct the Examiner's attention to the following data:

In the Examples of the present specification ...

- Polymerization Examples 1, 2, and 3 illustrate the inventive polymer (A) containing each of components (1), (2), (3), and (4);
- Polymerization Examples 4 and 6 illustrate polymer (a) containing only components (1), (2), and (4); and
- Polymerization Example 7 illustrates polymer (b) containing only components (1), (3), and (4).

For the Examiner's convenience the composition of these polymerization examples are reproduced below from Tables 4 and 5 (pages 36 and 37, respectively).

In addition, reproduced below in relevant part are Tables 7 and 8 (pages 40 and 41, respectively), which show the oil-repellency results measured for cotton and nylon, respectively.

Reproduction of relevant parts of Tables 4 and 5:

Starting material	Polymerization Example 1	Polymerization Example 2	Polymerization Example 3	Polymerization Example 4	Polymerization Example 6	Polymerization Example 7
FA	1 5 8. 7	1 5 8. 7	1 5 8. 7	1 5 8. 7	1 5 8. 7	1 5 8. 7
BMA	9 7. 2	9 1. 8	9 1. 8	9 1. 8	1 0 5. 3	—
StA	1 3. 5	1 3. 5	1 3. 5	—	—	1 0 5. 3
VMA-70	—	—	—	—	—	—
GMA	—	5. 4	5. 4	5. 4	5. 4	5. 4
MOI-BM	1 0. 8	1 0. 8	—	—	1 0. 8	1 0. 8
MOI-py	—	—	1 0. 8	—	—	—
VI-BM	—	—	—	1 0. 8	—	—
BMAA	—	—	—	—	—	—
P204	1. 4	1. 4	1. 4	1. 4	1. 4	1. 4
E230	1 0. 8	1 0. 8	1 0. 8	1 0. 8	1 0. 8	1 0. 8
S485	1. 4	1. 4	1. 4	1. 4	1. 4	1. 4
STMAC	4. 3	4. 3	4. 3	4. 3	4. 3	4. 3
SLS	—	—	—	—	—	—
Na ₂ CO ₃	—	—	—	—	—	—
Acetic acid	1. 9	1. 9	1. 9	1. 9	1. 9	1. 9
DPG	1 0 8	1 0 8	1 0 8	1 0 8	1 0 8	1 0 8
Water	3 8 9. 9	3 8 9. 9	3 8 9. 9	3 8 9. 9	3 8 9. 9	3 8 9. 9
D ₂ O SH	0. 8	0. 8	0. 8	0. 8	0. 8	0. 8
VA-061	1. 2	1. 2	1. 2	1. 2	1. 2	1. 2
V-501	—	—	—	—	—	—
Particle size(μm)	1 2 5	1 3 2	1 4 0	1 1 5	1 2 5	2 6 3

Abbreviations:

FA: The above perfluoroalkylethyl acrylate,
BMA: Butyl methacrylate,
StA: Stearyl acrylate,
VMA-70: Mixture of stearyl methacrylate and behenyl methacrylate
MOI-BM: 2-Isocyanate ethyl methacrylate, the isocyanate group of which is blocked with 2-butanone oxime
MOI-PY: 2-Isocyanate ethyl methacrylate, the isocyanate group of which is blocked with 3,5-dimethylpyrazole

VI-VM: 1,3,3-Trimethyl-4-isocyanatecyclohexylmethyloxymethyl methacrylate, the isocyanate group of which is blocked with 2-butanone oxime
BMAA: N-butoxymethylacrylamide,
P204: Polyoxyethylene-polyoxypropylene block copolymer (Pronon 204 manufactured by NOF Corporation),
E230: Polyoxyethylene oleyl ether (average addition mol number of ethylene oxide=30)
S485: 4,7-Bispolyoxyethylene-2,4,7,9-tetramethyl-5-decyne
STMAC: Stearyltrimethylammonium chloride,
SLS: Sodium laurylsulfate,
DPG: Dipropylene glycol,
DoSH: Normal-dodecyl mercaptan,
VA-061: 2,2'-azobis[2-(2-imidazolin-2-yl)propane], and
V-501: 4,4'-Azobis(4-cyanovaleric acid)

Table 7 (partial reproduction)

	Water- and oil-repellent composition	Water-repellency/oil-repellency, cotton broadcloth		
		Initial stage	HL-5 after drying in air	HL-5 after drying at 75°C
Ex. 1	Polymerization Ex. 1	1 0 0 / 5	7 0 ⁺ / 2	8 0 / 2
Ex. 2	Polymerization Ex. 2	1 0 0 / 5	8 0 ⁻ / 2	8 0 ⁺ / 3
Ex. 3	Polymerization Ex. 3	1 0 0 / 5	7 0 ⁺ / 2	8 0 ⁺ / 2
Ex. 4	Polymerization Ex. 4	1 0 0 / 5	7 0 / 1	8 0 ⁻ / 2
Ex. 6	Polymerization Ex. 6	1 0 0 ⁻ / 4	7 0 ⁻ / 1	7 0 ⁺ / 1
Ex. 7	Polymerization Ex. 7	1 0 0 ⁻ / 4	7 0 ⁻ / 0	7 0 / 1

Table 8 (partial reproduction)

	Water- and oil-repellent composition	Water-repellency/oil-repellency, nylon Taslan cloth		
		Initial stage	HL-10 after drying in air	HL-10 after drying at 75°C
Ex. 1	Polymerization Ex. 1	1 0 0 / 5	7 0 / 3	1 0 0 ⁻ / 4
Ex. 2	Polymerization Ex. 2	1 0 0 / 5	7 0 / 3	1 0 0 ⁻ / 4
Ex. 3	Polymerization Ex. 3	1 0 0 / 5	7 0 / 3	1 0 0 ⁻ / 4
Ex. 4	Polymerization Ex. 4	1 0 0 / 5	7 0 / 2	8 0 ⁺ / 3
Ex. 6	Polymerization Ex. 6	1 0 0 / 4	7 0 ⁻ / 3	8 0 ⁺ / 3
Ex. 7	Polymerization Ex. 7	1 0 0 / 4	7 0 ⁻ / 1	8 0 / 2

The Examiner is reminded of the description appearing on pages 29-30 of the experimental protocol to measure and evaluate water-repellency and oil-repellency. Moreover, the criteria below also provide the context for which the tables above may be understood.

(Evaluation of water-repellency)

Spraying test of JIS-L1092 1992 was carried out, and results were shown by water repellency numbers as illustrated in the following Table 1. Intermediate evaluation results between water repellency numbers were evaluated by attaching marks + and -, and + means a better result and - means a worse result.

Table 1

Water-repellency No.	State
100	No wet surface
90	Slightly wet surface
80	Partly wet surface
70	Wet surface
50	Whole wet surface
0	Completely wet surface on both front and back sides

(Evaluation of oil-repellency)

Oil-repellency test was carried out in accordance with AATCC-Test Method 118-1997, and results were shown by oil-repellency numbers as illustrated in the following Table 2.

Table 2

Oil-repellency No.	Test solution	Surface tension mN/m (25°C)
8	n-heptane	20.0
7	n-octane	21.8
6	n-decane	23.5
5	n-dodecane	25.0
4	n-tetradecane	26.7
3	n-hexadecane	27.3
2	Nujol 65 parts/hexadecane 35 parts	29.6
1	Nujol	31.2
0	Less than 1	-

As evidenced by the results reproduced from Tables 7 and 8, above, it is clearly apparent that a superior oil-repellency is obtained by employing the claimed invention (see Preparation Examples 1-3) compared to replacing polymer (A) with (a) a polymer containing only components (1), (2), and (4) (see Preparation Examples 4 and 6), and (b) a polymer containing only components (1), (3), and (4) (see Preparation Example 7). In view of the foregoing, Applicants submit that, *arguendo*, even if the combined disclosures Shimada et al and Ito et al did support a *prima facie* case of obviousness, the data above rebut the same.

Accordingly, Applicants request withdrawal of this ground of rejection.

The objection to Claims 1, 7, and 10 and the rejection of Claims 1-10 under 35 U.S.C. §112, second paragraph, are obviated by amendment.

Applicants note that the claims have been amended herein to be free of the Examiner's criticism. It is believed that this objection and rejection are no longer applicable.

In view of the present amendments, Applicants request withdrawal of this objection and rejection.

Applicants submit that the present application is in condition for allowance. Early notification to this effect is respectfully requested.

Respectfully submitted,

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